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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,659	08/07/2006	Hiroaki Yanagita	Q96380	9256

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EXAMINER	
GARRITY, DIANA C	
ART UNIT	PAPER NUMBER
2814	

MAIL DATE	DELIVERY MODE
12/31/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/588,659	YANAGITA ET AL.	
	Examiner	Art Unit	
	DIANA C. GARRITY	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 October 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/20/08; 9/4/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Amendment filed October 20, 2008 is acknowledged.

- Claims 1-28 are pending.
    - Claims 1-28 are examined below.
        - Claims 1-28 are rejected.

Response to Arguments

2. Applicant's arguments filed October 20, 2008 have been fully considered but they are not persuasive.

Regarding Polarity, Applicant asserts that Cl activity as a dopant is more than ten times higher activity than that of Cu. Examiner concedes that Cl dopant activity is higher than that of Cu, but requires proof that Cl activity is actually 10 times that of Cu. Until then, because the concentration of Copper is greater than that of Cl, it will be understood that the material described by Dimitrova is p-type.

Regarding Composition, regardless of the method by which the composition is created, the expression and description (page 136) as given by Dimitrova satisfies the composition as stated in the present claims.

Regarding Function of Cl Dopant, product by process claims are directed to the product per se, no matter now actually made. *In re Hirao*, 190 USPQ 15 at 17 (footnote

3). See *In re Fessman*, 180 USPQ 324, 326 (CCPA 1974); *In re Marosi et al.*, 218 USPQ 289, 292 (Fed. Cir. 1983); *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972); *In re Pilkington,* 411 F.2d 1345, 1348, 162 USPQ 145, 147, (CCPA 1969); *Buono v. Yankee Maid Dress Corp.,* 77F.2d 274, 279, 26 USPQ 57, 61 (2d. Cir. 1935); and particularly *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985), each make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps which must be determined in a "product by process" claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old and obvious patent produced by a new method is not a patentable product, whether claimed in "product by process" claims or not.

Note that Applicant has burden of proof in such cases as the above case law makes clear.

Regarding Quantity of Cl Dopant, given the expression in footnote 1 of Remarks, it is determined that the CL concentration of $0.37 \pm .01$ [at.%] is equivalent to a concentration 1.86×10^{20} cm^{-3}. The claims dictate that the concentration of the compensation dopant is 10^{17} to 10^{20}, which is a mere indication of the order of magnitude of the concentration. As seen above, $0.37 \pm .01$ [at.%] falls within the range as dictated to the precision given in the claims (MPEP 2131.03). Therefore, Applicant's argument is not persuasive.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dimitrova et al. (V. Dimitrova, J. Tate, Synthesis and characterization of some ZnS-based thin film phosphors for electroluminescent device applications, Thin Solid Films 365 (2000) pages 134-138, hereinafter "Dimitrova").

Regarding claim 1, Dimitrova teaches a p-type semiconductor material ($ZnS:CuCl_2$) material expressed in a composition formula of $Zn_{(1-\alpha-\beta-\gamma)}Cu_\alpha A_\beta B_\gamma S_{(1-x-y)}Se_xTe_y$ ($0.004 \leq \alpha \leq 0.4$, $\beta \leq 0.2$, $\gamma \leq 0.2$, $0 \leq x \leq 1$, $0 \leq y \leq 0.2$, and $x + y \leq 1$, A and B are elements selected from Cd, Hg and alkaline earth metals) (page 136, column 1, ln 3-12; The specification contains no disclosure of either the critical nature of the claimed expression—specifically concerning the amount of zinc—or any unexpected results arising therefrom beyond that as described by Dimitrova. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1995). Where patentability is based on a particular range, the Applicant must show that the chosen range is critical *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

Regarding claim 2, Dimitrova teaches that $\beta = 0$. When $\beta = 0$, A is trivial.

Regarding claims 3 and 4, Dimitrova teaches that $\gamma = 0$. When $\gamma = 0$, B is trivial.

Regarding claim 5, 11, 12, and 13, Dimitrova teaches the semiconductor material contains at least one dopant selected from Cl, Br, I, Al, Ga and In as a compensation dopant (Cl_2) and a concentration of the compensation dopant is 10^{17} to 10^{20} cm^{-3} (Table 1, Cl (at.%) = 0.37 ± 0.01, which is equivalent to a concentration of $7.4\times10^{19}cm^{-3}$. For more information, see Application, paragraphs 7 and 10).

Regarding claims 6, 14, 15, and 16, Dimitrova teaches the semiconductor material has a light absorption coefficient of $5\times10^{5}cm^{-1}$ or less at 471 to 750 nm (page 136, ln 41-43). By the equation $T = 10^{-\alpha l}$, where α is the light absorption coefficient, l is the path length, and T is the transmissivity.

Regarding claims 7, 17, 18, and 19, Dimitrova teaches a volume resistivity of the semiconductor material is equal to or higher than $10^{-4}\Omega cm$ and is lower than $10^{3}\ \Omega cm$ (page 136, column 2, ln 20-22).

Regarding claims 8, 20, 21, and 22, Dimitrova teaches a carrier concentration (concentration of dopant - in this case, copper) is equal to or higher than 10^{16} cm^{-3} and is lower than $10^{22}cm^{-3}$ (Table 1, Cu (at.%) = 2.38 ± 0.07, which is equivalent to a concentration of $4.76\times10^{20}cm^{-3}$. For more information, see Application, paragraphs 7 and 10).

Regarding claims 9, 23, 24, and 25, Dimitrova teaches the p-type semiconductor material of claim 1, constituting a hole injecting (inherent to p-type material) electrode layer (Official notice is taken that when ZnS is used in an electroluminescent device – page 134, column 1, ln 1-9 – it is used as an electrode layer) in an amorphous phase or a polycrystalline phase (Abstract).

Regarding claims 10, 26, 27, and 28, Dimitrova teaches the semiconductor device is a light emitting device (Abstract, and page 134, column 1, ln 1-9).

Conclusion

4. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DIANA C. GARRITY whose telephone number is (571) 270-5026. The examiner can normally be reached on Monday-Friday 7:00 AM - 3:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anh Mai can be reached on (571) 272-1710. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Diana C Garrity/
Examiner, Art Unit 2814

/Anh D. Mai/
Primary Examiner, Art Unit 2814